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DEC 08 2006 NREL 01-36

REMARKS

Claims 1, 2, 4, 5, 7-9, 12, 14, 15, 28, 30-36, 43, 48, 50-58 are pending in the application. Claims 3, 10, 11, 13, 16-27, 29, 37-42, 44-46 have been previously cancelled. Claims 6, 47 and 49 are currently cancelled. Claims 1, 2, 12, 28, 31, 48, and 50-56 are currently amended. Claims 57, 58 and 59 are new claims.

Applicant has amended claims 1, 12, 28, 50, 53 and 55-58 to recite a 90% sequence identity with SEQ ID Nos 1, 3, 4 or 5. Support for these amendments is found at lines 34-36 on page 20 of the specification.

I. Claim Objections

Claims 47 has been cancelled.

II. Claim Rejections—35 U.S.C. 112 second paragraph

Claims 2, 4, 5, 7-9, 49 and 52 stand rejected under 35 U.S.C. §112 second paragraph as being indefinite. The Examiner maintains that the phrase "a catalytic domain of a glycosyl hydrolase family 74 (GH74_Ace) enzyme" renders the claims indefinite. Applicant continues to traverse these rejections for reasons set forth in previous responses. Applicant has amended claims 2 and 49 to delete reference to the further define the GH74_Ace catalytic domain, which is now merely a GH74 family domain. Claims 4, 5, 7-9 all depend from Claim 2. Applicant believes that these amendments should overcome the rejections and withdrawal of these rejections is respectfully requested.

The Examiner also rejects Claim 31 under 35 U.S.C. §112 second paragraph for reciting "substrate targeting moiety." The Examiner states that the term "substrate" is not defined in the specification because the definition on page 9 of the instant specification is "only exemplary." Applicant respectfully disagrees. The language on page 9 of the instant specification "[t]he substrate can be a polymer such as cellulose or can be a complex molecule or aggregate of molecules where the entire moiety comprises at least some cellulose" is not merely exemplary. The exemplary part of the sentence only starts after the

PATENT
NREL 01-36

phrase "such as," whereas "polymer" is the object of the sentence and therefore this definition is not merely exemplary.

The instant specification also provides carbohydrate binding domains and cellulose as an example of the substrate targeting moiety/substrate pair.

Accordingly, Applicant has now amended claim 31 to define the substrate as a "carbohydrate polymer." One of ordinary skill in the art would understand the metes and bounds for the term carbohydrate polymer. Withdrawal of the rejection of Claim 31 based on 35 U.S.C. §112 second paragraph is respectfully requested.

Claim 6 is also rejected under 35 U.S.C. §112 second paragraph. Claim 6 has now been cancelled which renders the rejection moot.

III. Claim Rejections—35 U.S.C. §112 first paragraph-Enablement

Claims 28, 30-36 and 43 stand rejected under 35 U.S.C. §112 first paragraph for lack of enablement. The Examiner states that "without a recitation of the desired activity, the skilled artisan would not know how to make and use the desired invention." Applicant has amended claim 28 to recite the catalytic activity. Claims 30-36 and 43 all depend from Claim 28. Applicant believes these amendments should overcome the Examiner's rejection for lack of enablement. Withdrawal of the rejection based on 35 U.S.C. §112 first paragraph is respectfully requested.

IV. Claim Rejections—35 U.S.C. §112 first paragraph-Written Description

Claims 1, 2, 4-9, 12, 14, 15, 28, 30-36, 43, 47-51 and 53-56 stand rejected under 35 U.S.C. §112 first paragraph as failing to comply with the written description requirement. The Examiner states that amendments to these claims introduce new matter. More specifically, the Examiner maintains that because the instant specification does not disclose "at least 99% sequence identity with SEQ ID No: 1, 3, 4 or 5," or "at least 95% sequence identity with SEQ ID No 1," the introduction of these various limitations to the claims constitutes new matter. Applicant has amended these rejected claims to recite "90% identity" which is

PATENT
NREL 01-36

supported by the original disclosure on page 20, line 35 of the specification. Withdrawal of the rejection of Claims 1, 2, 4-9, 12, 14, 15, 28, 30-36, 43, 48-51 and 53-56 under 35 U.S.C. §112 First Paragraph is respectfully requested.

The Examiner will appreciate, as described on line 21 of page 37 of the Specification, that the table on page 38 confirms GH74_Ace as a GH74 family enzyme on the basis of 46% homology in the catalytic domain. In view of this teaching, it is sufficient for purposes of enablement that the claims now recite 90% identity with respect to SEQ ID NO. 1, which is the sequence for GH74_Ace—the catalytic domain being SEQ ID NO. 3. That 90% identity or homology may be sufficient for purposes of enablement is confirmed by *Ex parte Cocks*, Appeal No. 2002-0870.¹ The notion that applicant has disclosed only one species is false. The table on page 38 provides significant guidance for making equivalent substitutions—literally hundreds or more according to the disclosure there taught. See also claim 50.

Claims 28, 30-36 and 43 stand rejected under 35 U.S.C. §112 first paragraph for insufficient written description. The Examiner states that the original specification does not have a disclosure of the function of all polypeptides having at least 99% identity with SEQ ID Nos 1, 3, ,4 or 5. Claims 28 has been amended to recite only SEQ ID NO 3 as well as the catalytic activity of the catalytic domain exemplified by the polypeptide of SEQ ID NO 3. Claims 30-36 and 43 all depend from claim 28. Withdrawal of rejections for insufficient written description of these claims under 35 U.S.C. §112 first paragraph is respectfully requested.

Claims 47, 48, 50, 51, and 54 stand rejected under 35 U.S.C. §112 first paragraph as failing to comply with the written description requirement. The Examiner takes the position that the original specification and claims fail to disclose the limitation of "identical to SEQ ID NO. 3 in each conserved position marked by an asterisk (*), as shown below in comparison to *Aspergillus*

¹ A copy is attached. *Ex parte Cocks* was not written for publication and is not binding upon the Board of Appeals; however, one reaches the same result in this case by application of the cases relied upon there including *PPG Indus., Inc. v. Guardian Indus. Corp.*, 75 F.3d 1558, 1564 (Fed. Cir. 1996). Although enablement is measured from the standpoint of undue experimentation, the standard is not meant to be unduly extensive. See *In re Ansgardt*, 537 F.2d 498, 504 (CCPA 1976) ("appellants are not required to disclose every species encompassed by their claims even in an unpredictable art.")

PATENT
NREL 01-36

aculeatus Avicelase III (AvIII_Aac)." Applicant respectfully traverses this rejection. Table 5 on page 37 of the original specification shows the sequence comparison between GH74_Ace and AvIII_Aac. Page 36 contains language explaining that an asterisk * indicates that identical or conserved residues in all sequences in the alignment. See lines 10-11, page 36. Tables 1 and 2 further provides that SEQ ID NO 3 is the sequence of GH74_Ace. Thus, the limitation "identical to SEQ ID NO. 3 in each conserved position marked by an asterisk (*), as shown below in comparison to *Aspergillus aculeatus* Avicelase III (AvIII_Aac)." is fully supported by the original specification. Withdrawal of rejections for insufficient written description of these claims under 35 U.S.C. §112 first paragraph is respectfully requested.

V. Claim Rejections—35 U.S.C. §102

Claims 1, 2, 4-12, 14, 28, 36, 43 and 47-54 stand rejected under 35 U.S.C. §102(b) as being anticipated by Adney et al., 1994 or Tucker et al. 1989. The Examiner states that both of Adney and Tucker teach a composition comprising the culture supernatant of *Acidothermus cellulolyticus*. The Examiner reasons that the culture supernatant more likely than not contains the cellulase of SEQ ID NO: 1 and therefore these Claims are anticipated by Adney or Tucker. Applicant continues to traverse these rejections as they are speculative. Applicant also notes that Claims 55 and 56 are not rejected over Adney or Tucker. Applicant has amended independent claims 1, 12, 28 49, 52 and 53 to incorporate the claim limitations that the polypeptides are genetically engineered by expression in a heterologous cell. Claims 2, 4, 5, 7-9, 14, 36, 43, 48, 51 and 54 all depend from independent claims 1, 12, 28 49, 52 or 53 directly or indirectly. Claims 6, 10-11, 47 and 50 have been cancelled. Applicant believes that these amendments distinguish both Adney and Tucker because neither Adney nor Tucker teaches AvIII polypeptide that is genetically expressed in a heterologous cell. Withdrawal of the rejection under 35 U.S.C. 102(b) is respectfully requested.

PATENT
NREL 01-36**VI. Claim Rejections—35 U.S.C. §103**

Claims 1, 2, 4-9, 12, 14, 15, 28 and 47-54 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Mohaghegi et al. 1986 in view of Berghem et al. 1976 and Katz et al. 1968. Mohaghegi et al. 1986 is said to show the isolation of *Acidothermus cellulolyticus*, but not the isolation of cellulase therefrom. Berghem et al. 1976 is used to show the isolation of an endoglucanase from *Trichoderma viride*. Katz et al. supposedly shows motivation to combine, since it is desirable to generate alternative cellulases capable of commercial scale processing at elevated temperatures.

Applicant continues to traverse these rejections because the Office has not shown a *prima facie* case of obviousness. Applicant also notes that Claims 55 and 56 are not rejected over these references. Applicant has now amended independent claims 1, 12, 28 49, 52 and 53 to incorporate the claim limitations that the polypeptides are genetically engineered by expression in a heterologous cell. Claims 2, 4, 5, 7-9, 14, 36, 43, 48, 51 and 54 all depend from independent claims 1, 12, 28 49, 52 or 53 directly or indirectly. Claims 6, 10-11, 47 and 50 have been cancelled. Applicant believes that these amendments distinguish Mohaghegi, Berghem and Katz because none of these cited references teaches Avilll polypeptide that is genetically expressed in a heterologous cell. Thus not all claim limitations are taught or suggested by the prior art and withdrawal of the 35 U.S.C. §103 rejections is respectfully requested.

Applicant's representative believes that the amendments presented in this response place all pending claims in condition for allowance. The Commissioner is authorized to charge any additionally required fees to deposit account 12-0600. Should the Examiner have any questions, comments, or suggestions that would expedite the prosecution of the present case to allowance, Applicant's representative, Paul White, earnestly requests a telephone call at (303) 384-7575.

PATENT
NREL 01-36

Respectfully submitted



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12